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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/659,103	09/09/2003	Henry A. Hill	09712-333001 / Z-436	4329

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EXAMINER	
TURNER, SAMUEL A	

ART UNIT	PAPER NUMBER
2877	

DATE MAILED: 08/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/659,103	HILL, HENRY A.	
	Examiner	Art Unit	
	Denise B. Anderson	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 April 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-53,55,56,58 and 62-64* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-53,55,56,58 and 62-64* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 29 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The last line of the claim is not a complete thought, and the examiner is unable to interpret what applicant means by this recitation.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-43, 53,55-56, 58 and 62-64 rejected under 35 U.S.C. 101 because merely determining the location of the alignment mark (independent claim 1), calculating or determining a correction term (independent claims 1 and 30), correcting measurements of a degree of freedom (independent claims 17 and 40), or monitoring a position (new claims 62-64) would not appear to be sufficient to constitute a tangible result, since the outcome of the determining or calculating or correcting or monitoring steps have not been used in a disclosed practical application nor made available in such a manner that its usefulness in a disclosed practical application can be realized. Furthermore, the dependent claims from these independent claims (claims 1, 17, 30 and 40) do not disclose a step by which the determining, calculating, correcting or

monitoring steps are used in a disclosed practical application. See OG Notices: 22 November 2005, "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility". Furthermore, in Part b. of *Practical Application the Produces a Useful, Concrete, and Tangible Result* under Section IV *Determine Whether the Claimed Invention Complies with the Subject Matter Eligibility Requirement of 35 U.S.C. Sec. 101,* sentence 3, in the OG Notice from 22 November 2005 states 'In determining whether the claim is for a "practical application," the focus is not on whether the steps taken to achieve a particular result are useful, tangible, and concrete, but rather that the final result achieved by the claimed invention is "useful, tangible, and concrete."'

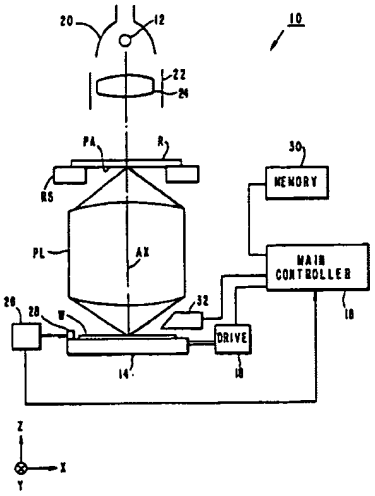
Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-4, 10-12, 17-23, 25-27, 30, 36, 38, 39, 44-53, 55, and 62-64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamiya (5,790,253), and further in view of Badami et al (USPN 6,181,420).

FIG.1



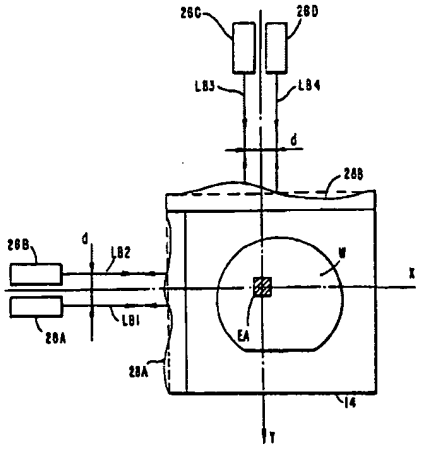


FIG.2

As to claim 1, Kamiya teaches a method for determining the location of an alignment mark on a stage, the method comprising: measuring a location, x_1, of a stage along a first measurement axis using an interferometer(column 2, lines 5-27); measuring a location, x_2, of the stage along a second measurement axis substantially parallel to the first measurement axis(column 2, lines 5-27); and determining a location of the alignment mark along a third axis substantially parallel to the first measurement axis based on x_1, x_2, and a correction term, ψ_3, calculated from predetermined information comprising information characterizing imperfections in the interferometer(column 6, lines 14-17 and column 10, lines 27-51). Note that the imperfections in the interferometer are the measurement mirror curving errors.

Kamiya does not expressly disclose that the imperfections are in the interferometer optics, which directs the measurement beam to a separate mirror. Badami et al disclose correcting for imperfections in the interferometer optics

which direct a measurement beam to a separate mirror (see figure 1; column 2, lines 29-30, and column 7, lines 62-65 describing the averaged phase as a term for correcting the cyclic errors, which are due to imperfections in the interferometer optics). It would have been obvious to one of ordinary skill in the art at the time of the invention to correct for imperfections in the interferometer optics using an device such as Kamiya for determining alignment marks for the purpose of improving the accuracy of the position measurements, as described in Badami et al (column 2, lines 9-15).

As to claim 2, wherein x_1 and x_2 correspond to the location of the mirror at the first and second measurement axes, respectively (column 8, lines 40-47).

As to claim 3, wherein x_2 is measured using a second interferometer (column 8, lines 40-47).

As to claim 4, wherein the predetermined information comprises information characterizing imperfections in the second interferometer (column 8, lines 40-47). Note that the imperfections in the interferometer are the measurement mirror curving errors.

As to claim 10, further comprising interferometrically monitoring the location of the stage along a y-axis substantially orthogonal to the first measurement axis (column 8, lines 40-47).

As to claim 11, wherein the measurement beam reflects from the mirror more than once (column 2, lines 42-48).

As to claim 12, wherein the predetermined information further comprises information characterizing surface variations of the mirror (column 7, lines 41-53).

As to claim 17, Kamiya teaches a method, comprising: determining a correction term related to imperfections in an interferometry system from measurements of first and second degrees of freedom of a measurement object with the interferometry system (column 8, lines 40-47); and correcting subsequent measurements of a third degree of freedom of the measurement object made using the interferometry system based on the correction term (column 10, lines 37-51). Note that the imperfections in the interferometer are the measurement mirror curving errors.

Kamiya does not expressly disclose that the imperfections are in the interferometer optics, which directs the measurement beam to a separate mirror. Badami et al disclose correcting for imperfections in the interferometer optics, which direct a measurement beam to a separate mirror (see figure 1; column 2, lines 29-30, and column 7, lines 62-65 describing the averaged phase as a term for correcting the cyclic errors, which are due to imperfections in the interferometer optics). It would have been obvious to one of ordinary skill in the art at the time of the invention to correct for imperfections in the interferometer optics using an device such as Kamiya for determining alignment marks for the purpose of improving the accuracy of the position measurements, as described in Badami et al (column 2, lines 9-15).

As to claim 18, wherein the first and second degrees of freedom comprise positions of the measurement object relative to first and second axes of the interferometry system, respectively (column 8, lines 40-47).

As to claim 19, wherein the first axis is substantially parallel to the second axis (column 8, lines 40-47).

As to claim 20, wherein the third degree of freedom comprises a position of the measurement object relative to a third axis substantially parallel to the first and second axes (column 10, lines 37-51).

As to claim 21, wherein the second axis is located between the first and third axes (see the x-axis between the interferometers 26A and 26B).

As to claim 22, wherein the measurement object comprises a plane mirror (column 7, lines 41-53).

As to claim 23, wherein the correction term further comprises information related to surface variations of the plane mirror (column 7, lines 41-53).

As to claim 25, wherein the interferometry system comprises first and second interferometers which during operation monitor the first and second degrees of freedom, wherein the correction term comprises information related to imperfections in the first and second interferometers (column 7, lines 41-53). Note that the imperfections in the interferometer are the measurement mirror curving errors.

As to claim 26, wherein the imperfections comprise bulk imperfections (column 7, lines 41-53). Note that the imperfections in the interferometer are the measurement mirror curving errors.

As to claim 27, wherein the imperfections comprises surface imperfections (column 7, lines 41-53).

As to claim 30, Kamiya teaches a method comprising: scanning a mirror surface relative to a pair of substantially parallel measurement axes of an interferometry system for a plurality of scan paths of different relative positions of the mirror surface along the measurement axes (column 8, lines 40-47); monitoring locations X_1 and X_2 of the mirror surface relative to the interferometric measurement axes with the interferometry system during the scanning (column 8, lines 40-47); determining a profile of the mirror surface for each of the scan paths based on the monitored locations(column 7, lines 41-53); and determining a correction term related to imperfections in the interferometer based on variations between the mirror profiles(column 10, lines 37-51).

Kamiya does not expressly disclose that the imperfections are in the interferometer optics, which directs the measurement beam to a separate mirror. Badami et al disclose correcting for imperfections in the interferometer optics, which direct a measurement beam to a separate mirror (see figure 1; column 2, lines 29-30, and column 7, lines 62-65 describing the averaged phase as a term for correcting the cyclic errors, which are due to imperfections in the interferometer

optics). It would have been obvious to one of ordinary skill in the art at the time of the invention to correct for imperfections in the interferometer optics using an device such as Kamiya for determining alignment marks for the purpose of improving the accuracy of the position measurements, as described in Badami et al (column 2, lines 9-15).

As to claim 36, wherein determining the mirror profile for each scan path comprises monitoring an orientation of the mirror surface with respect to the measurement axes during the scanning (column 8, lines 42+).

As to claim 38, wherein the scan paths are substantially orthogonal to the measurement axes (column 8, lines 42+).

As to claim 39, wherein the mirror surface is scanned along one of the scan paths for a plurality of nominal rotation angles with respect to the measurement axes, and a mirror scan profile is determined for each of the nominal rotation angles (column 8, lines 42+).

As to claim 44, Kamiya teaches an apparatus comprising: an interferometer configured to monitor a location, x_1, of a mirror surface along a first axis (26A); and an electronic controller (18) coupled to the interferometer, wherein during operation the electronic controller determines a location of the mirror surface along a third axis based on x_1, a location, x_2, of the mirror surface along a second axis and a correction term, ψ_3, calculated from predetermined information comprising information characterizing imperfections in the interferometer.

Kamiya does not expressly disclose that the imperfections are in the interferometer optics, which directs the measurement beam to a separate mirror. Badami et al disclose correcting for imperfections in the interferometer optics, which direct a measurement beam to a separate mirror (see figure 1; column 2, lines 29-30, and column 7, lines 62-65 describing the averaged phase as a term for correcting the cyclic errors, which are due to imperfections in the interferometer optics). It would have been obvious to one of ordinary skill in the art at the time of the invention to correct for imperfections in the interferometer optics using an device such as Kamiya for determining alignment marks for the purpose of improving the accuracy of the position measurements, as described in Badami et al (column 2, lines 9-15).

As to claim 45, further comprising a second interferometer configured to monitor x_2 (26B).

As to claim 46, wherein the correction term, ψ_3, is calculated from predetermined information comprising information characterizing imperfections in the second interferometer (18).

As to claim 47, wherein the correction term, ψ_3, is calculated from predetermined information comprising information characterizing imperfections in the mirror surface (18).

As to claim 48, wherein the first axis is substantially parallel to the second measurement axis (see figure 2).

As to claim 49, wherein the third axis is substantially parallel to the first axes and the second axis is located between the first and third axes (see figure 2).

With regard to claim 50, Kamiya teaches a lithography system for use in fabricating integrated circuits on a wafer, the system comprising: a stage for supporting the wafer (14,W); an illumination system for imaging spatially patterned radiation onto the wafer (12,PL); a positioning system for adjusting the position of the stage relative to the imaged radiation (16); and the apparatus of claim 44(see claim 44 above) for monitoring the position of the wafer relative to the imaged radiation.

As to claim 51, Kamiya teaches a lithography system for use in fabricating integrated circuits on a wafer, the system comprising: a stage for supporting the wafer (14,W); and an illumination system including a radiation source (12), a mask (R), a positioning system (16), a lens assembly (PL); and the apparatus of claim 44(see claim 44 above), wherein during operation the source directs radiation through the mask to produce spatially patterned radiation, the positioning system adjusts the position of the mask relative to the radiation from the source, the lens assembly images the spatially patterned radiation onto the wafer, and the apparatus monitors the position of the mask relative to the radiation from the source.

As to claims 52 and 64, Kamiya teaches a beam writing system for use in fabricating a lithography mask, the system comprising: a source providing a write

beam to pattern a substrate; a stage supporting the substrate (14,W); a beam directing assembly for delivering the write beam to the substrate (12,PL); a positioning system for positioning the stage and beam directing assembly relative one another (16); and the apparatus of claim 44(see claim 44 above) for monitoring the position of the stage relative to the beam directing assembly.

As to claims 53 and 62, Kamiya teaches a lithography method for use in fabricating integrated circuits on a wafer, the method comprising: supporting the wafer on a moveable stage (column 5, lines 13-15); imaging spatially patterned radiation onto the wafer (column 5, lines 10-13); adjusting the position of the stage (column 5,lines 47-50); and monitoring the position of the stage using an interferometery sytem for determining the location mark using the method of claim 1(see claim 1 above).

As to claims 55 and 63, Kamiya teaches a lithography method for fabricating integrated circuits on a wafer comprising: positioning a first component of a lithography system relative to a second component of a lithography system to expose the wafer to spatially patterned radiation (column 5, lines 8+); and monitoring the position of the first component relative to the second component using an interferometry system for determining an alignment mark using the method of claim 1 (see claim 1 above).

Claims 56 and 58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamiya(5,790,253) and Badami et al (USPN 6,181,420), and further in view of what is well known in the prior art (Official Notice).

With regard to claims 56 and 58, Kamiya teaches a method for fabricating integrated circuits, the method comprising forming a pattern of a mask by exposing the wafer to radiation (column 5, lines 10-13 and lines 35-40) and producing an integrated circuit (column 5, line 12). Kamiya does not expressly disclose applying a photoresist to the wafer. It is well known in the prior art to apply resists to wafers for improving the manufacturing process of the wafer. It would have been obvious to one of ordinary skill in the art at the time of the invention to apply resist to the wafer of Kamiya as is well known to do in the prior art for the purpose of improving the circuit manufacturing process.

Several facts have been relied upon from the personal knowledge of the examiner about which the examiner took Official Notice. Applicant must seasonably challenge well known statements and statements based on personal knowledge when they are made by the Board of Patent Appeals and Interferences. In re Selmi, 156 F.2d 96, 70 USPQ 197 (CCPA 1946); In re Fischer, 125 F.2d 725, 52 USPQ 473 (CCPA 1942). See also In re Boon, 439 F.2d 724, 169 USPQ 231 (CCPA 1971) (a challenge to the taking of judicial notice must contain adequate information or argument to create on its face a reasonable doubt regarding the circumstances justifying the judicial notice). If applicant does not seasonably traverse the well-known statement during examination, then the object of the well known statement is taken to be admitted prior art. In re

Chevenard, 139 F.2d 71, 60 USPQ 239 (CCPA 1943). A seasonable challenge constitutes a demand for evidence made as soon as practicable during prosecution.

The remaining claim limitations found in claims 44-52 are functional limitations and these limitations can be met by the prior art if the structure of the prior art is capable of performing the claimed functions.

2114 [R-1] Apparatus and Article Claims — Functional Language

APPARATUS CLAIMS MUST BE STRUCTURALLY DISTINGUISHABLE FROM THE PRIOR ART

While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. In re Schreiber, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997) (The absence of a disclosure in a prior art reference relating to function did not defeat the Board's finding of anticipation of claimed apparatus because the limitations at issue were found to be inherent in the prior art reference); see also In re Swinehart, 439 F.2d 210, 212-13, 169 USPQ 226, 228-29 (CCPA 1971); In re Danly, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). "[A]pparatus claims cover what a device is, not what a device does." Hewlett-Packard Co. v. Bausch & Lomb Inc., 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990) (emphasis in original).

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-61 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-31 of copending Application No. 10/630,361. Although the conflicting claims are not identical, they are not patentably distinct from each other.

The instant application generates the correction term ψ_3 from predetermined information comprising information characterizing imperfections in the interferometer.

Copending Application No. 10/630,361 generates the correction term ψ_3 from predetermined information characterizing surface variations of the mirror for different spatial frequencies, wherein contributions to the correction term from different spatial frequencies are weighted differently.

The instant application is broader in scope than the claims of the 10/630,361 application and thus cover the same limitations. See claims 12 and 13 of the instant application for imperfections in the interferometer drawn directly to mirror variations and weighting functions.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

FAX/Telephone Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Denise B. Anderson whose telephone number is 571-272-8324. The examiner can normally be reached on Mon-Fri (9:30 AM - 6 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley Jr. can be reached on 571-272-2800 ext. 77. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Gregory J. Toatley, Jr.
Supervisory Patent Examiner
Art Unit 2877

DBA
Date Signed: 8/8/06